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Applicants: B.D. Ratner et al. Attorney Docket No. UWOTL121535
Application No.: 10/630,235 Group Art Unit: 1645
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Title: APPARATUS AND METHODS FOR BINDING MOLECULES AND CELLS

U.S. PATENT DOCUMENTS

*Examiner Initials	Cite No.	Document No.	Kind Code	Date (mm/dd/yyyy)	Name
	U1	5,776,748	A	07/07/1998	Singhvi et al.
	U2	5,976,826	A	11/02/1999	Singhvi et al.
	U3	6,368,838	B1	04/09/2002	Singhvi et al.
	U4	6,471,761	B2	10/29/2002	Fan et al.
	U5	6,491,061	B1	12/10/2002	Lopez et al.

FOREIGN PATENT DOCUMENTS

None.

OTHER INFORMATION

(Including Author, Title, Date, Pertinent Pages, Etc.)

*Examiner Initial	Cite No.	
	O1	Achiha, K., et al., "Interactions Between Temperature-Sensitive Hydrogel Microspheres and Granulocytes," <i>Polymers for Advanced Technologies</i> 6(7):534-540, 1995.
	O2	An, Y.H., et al., "Regaining Chondrocyte Phenotype in Thermosensitive Gel Culture," <i>Anatomical Record</i> 263(4):336-341, 2001.
	O3	Aoki, T., et al., "Effect of Phenylboronic Acid Groups in Copolymers on Endothelial Cell Differentiation Into Capillary Structures," <i>Journal of Biomaterials Science-Polymer Edition</i> 9(1):1-14, 1997.
	O4	Arenkov, P., et al., "Protein Microchips: Use for Immunoassay and Enzymatic Reactions," <i>Analytical Biochemistry</i> 278(2):123-131, 2000.

*Examiner Initial	Cite No.
_____	O5 Aso, Y., et al., "Thermally Controlled Protein Release From Gelatin-Dextran Hydrogels," <i>Radiation Physics and Chemistry</i> 55(2):179-183, 1999.
_____	O6 Badiger, M.V., et al., "Interrelation Between the Thermodynamic and Viscometric Behaviour of Aqueous Solutions of Hydrophobically Modified Ethyl Hydroxyethyl Cellulose," <i>Polymer</i> 41(4):1377-1384, 2000.
_____	O7 Baier, R.E., et al., "Surface Properties Determine Bioadhesive Outcomes: Methods and Results," <i>J. Biomed. Mater. Res.</i> 18(4):337-355, 1984.
_____	O8 Bailey, S.N., et al., "Applications of Transfected Cell Microarrays in High-Throughput Drug Discovery," <i>Drug Discovery Today</i> 7(18):S113-S118, 2002.
_____	O9 Benesch, J., et al., "Protein Adsorption to Oligo(Ethylene Glycol) Self-Assembled Monolayers: Experiments with Fibrinogen, Heparinized Plasma, and Serum," <i>J. Biomater. Sci.-Polym. Ed.</i> 12:581-597, 2001.
_____	O10 Benkhira, A., et al., "Interactions of Ethylene Oxide/Methylene Oxide Copolymers With Sodium Dodecyl Sulphate," <i>Polymer</i> 41(20):7415-7425, 2000.
_____	O11 Bhatia, S.N., et al., "Effect of Cell-Cell Interactions in Preservation of Cellular Phenotype: Cocultivation of Hepatocytes and Nonparenchymal Cells," <i>FASEB J.</i> 13(14):1883-1900, November 1999.
_____	O12 Biran, I., and D.R. Walt, "Optical Imaging Fiber-Based Single Live Cell Arrays: A High-Density Cell Assay Platform," <i>Anal. Chem.</i> 74(13):3046-3054, July 1, 2002.
_____	O13 Bohanon, T., et al., "Neural Cell Pattern Formation on Glass and Oxidized Silicon Surfaces Modified With Poly(N-Isopropylacrylamide)," <i>J. of Biomater. Sci. Polymer Edn.</i> 8(1):19-39, 1996.
_____	O14 Bohdanecký, M., et al., "Cloud Point Curves of Aqueous Solutions of Poly(N-Ethylmethacrylamide)," <i>Collection of Czechoslovak Chemical Communications</i> 58(10):2370-2382, October 1993.
_____	O15 Böhringer, K.F., "Surface Modification and Modulation in Microstructures: Controlling Protein Adsorption, Monolayer Desorption and Micro-Self-Assembly," <i>J. Micromech. Microeng.</i> 13:S1-S10, 2003.
_____	O16 Chen, G., et al., "Effect of Protein and Cell Behavior on Pattern-Grafted Thermoresponsive Polymer," <i>J. Biomed. Mater. Res.</i> 42:38-44, 1998.
_____	O17 Chevillard, C., and M.A.V. Axelos, "Phase Separation of Aqueous Solution of Methylcellulose," <i>Colloid Polym. Sci.</i> 275(6):537-545, June 1997.

*Examiner Cite
Initial No.

-
- _____ O18 Chiu, D.T., et al., "Patterned Deposition of Cells and Proteins Onto Surfaces by Using Three-Dimensional Microfluidic Systems," *Proc. Natl. Acad. Sci. USA* 97(6):2408-2413, March 14, 2000.
- _____ O19 Christova, D., et al., "New Thermo-Responsive Polymer Materials Based on Poly(2-Ethyl- 2-Oxazoline) Segments," *Polymer* 44(8):2255-2261, 2003.
- _____ O20 Curti, P.S., et al., "Surface Modification of Polystyrene and Poly(ethylene terephthalate) by Grafting Poly(N-Isopropylacrylamide)," *J. Mater. Sci.-Mater. Med.* 13(12):1175-1180, December 2002.
- _____ O21 d'Agostino, R., et al., (eds), *Plasma Processing of Polymers, NATO-ASI Series E: Applied Sciences Vol. 346*, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1996, pp. 347-363.
- _____ O22 Dobashi, A., et al., "Control of the Solubility Transition in Novel Temperature-Responsive Linear Polymers Comprising α -Amino Acid Diamide Derivatives," *Analytical Sciences* 16(8):829-835, August 2000.
- _____ O23 Dorn, I.T., et al., "Diacetylene Chelator Lipids as Support for Immobilization and Imaging of Proteins by Atomic Force Microscopy," *Langmuir* 14(17):4386-4842, 1998.
- _____ O24 Dworak, A., et al., "Hydrophobically Modified Polyglycidol - the Control of Lower Critical Solution Temperature," *Polymer Bulletin* 50(1-2):47-54, 2003.
- _____ O25 Elwing, H., et al., "A Wettability Gradient Method for Studies of Macromolecular Interactions at the Liquid/Solid Interface," *J. Colloid Interface Sci.* 119(1):203-210, September 1987.
- _____ O26 Figeys, D., "Array and Lab on a Chip Technology for Protein Characterization," *Curr. Opin. Mol. Ther.* 1(16):685-694, 1999.
- _____ O27 Folch, A., et al., "Microfabricated Elastomeric Stencils for Micropatterning Cell Cultures," *J. Biomed. Mater. Res.* 52:346-353, 2000.
- _____ O28 Folch, A., et al., "Molding of Deep Polydimethylsiloxane Microstructures for Microfluidics and Biological Applications," *J. Biomech. Eng.-Trans. ASME* 121:28-34, February 1999.
- _____ O29 Gan, L.H., et al., "New Stimuli-Responsive Copolymers of N-Acryloyl-N'-Alkyl Piperazine and Methyl Methacrylate and Their Hydrogels," *Polymer* 42(1):65-69, 2001.
- _____ O30 Groves, J.T., "Membrane Array Technology for Drug Discovery," *Current Opinion in Drug Discovery & Development* 5(4):606-612, 2002.

*Examiner Initial	Cite No.
_____	O31 Hanein, Y., et al., "Micromachining of Non-Fouling Coatings for Bio-MEMS Applications," <i>Sensors and Actuators B</i> 81:49-54, 2001.
_____	O32 Hiroki, A., et al., "P-Nitrophenol Permeability and Temperature Characteristics of an Acryloyl-L-Proline Methyl Ester-Based Porous Gel Membrane," <i>J. of Polymer Sci. Part A: Polymer Chem.</i> 36(10):1495-1500, 1998.
_____	O33 Hirose, M., et al., "Temperature-Responsive Surface for Novel Co-Culture Systems of Hepatocytes With Endothelial Cells: 2-D Patterned and Double Layered Co-Cultures," <i>Yonsei Medical J.</i> 41(6):803-813, 2000.
_____	O34 Hirsch, S.G., and R.J. Spontak, "Temperature-Dependent Property Development in Hydrogels Derived From Hydroxypropylcellulose," <i>Polymer</i> 43(1):123-129, 2002.
_____	O35 Hong, J.S., et al., "Cloud Points and Phase Separation of Aqueous Poly(N-Vinylacetamide) Solutions in the Presence of Salts," <i>Colloid and Polym. Sci.</i> 274(11):1013-1019, November 1996.
_____	O36 Horbett, T.A., et al., "Cell Adhesion to a Series of Hydrophilic-Hydrophobic Copolymers Studied With a Spinning Disk Apparatus," <i>J. Biomed. Mater. Res.</i> 22(5):383-404, May 1988.
_____	O37 Hourdet, D., et al., "Reversible Thermo-thickening of Aqueous Polymer Solutions," <i>Polymer</i> 35(12):2624-2630, 1994.
_____	O38 Idziak, I., et al., "Thermosensitivity of Aqueous Solutions of Poly(N,N-Diethylacrylamide)," <i>Macromolecules</i> 32(4):1260-1263, 1999.
_____	O39 Ito, Y., et al., "Patterned Immobilization of Thermoresponsive Polymer," <i>Langmuir</i> 13(10):2756-2759, 1997.
_____	O40 Kane, R.S., et al., "Patterning Proteins and Cells Using Soft Lithography," <i>Biomaterials</i> 20:2363-2376, 1999.
_____	O41 Katono, H., et al., "Thermoresponsive Swelling and Drug Release Switching of Interpenetrating Polymer Networks Composed of Poly (Acrylamide- Co-Butyl Methacrylate) and Poly (Acrylic-Acid)," <i>Journal of Controlled Release</i> 16(1-2):215-227, 1991. < http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T3D-475TCXK-12J&_user=10&_handle=... > [Abstract retrieved January 9, 2004]
_____	O42 Kim, Y.D., et al., "Stable Sol-Gel Microstructured and Microfluidic Network for Patterning," <i>Biotechnol. Bioeng.</i> 73(5):331-337, June 5, 2001.

*Examiner Cite
Initial No.

-
- _____ O43 Klages, C.-P., "Modification and Coating of Biomaterial Surfaces by Glow-Discharge Processes. A Review," *Mat.-wiss. u. Werkstofftech* 30:767-774, 1999.
- _____ O44 Kubota, N., et al., "Temperature-Responsive Properties of Poly(acrylic acid-co-acrylamide)-graft-Oligo(ethylene glycol) Hydrogels," *J. of Appl. Polym. Sci.* 80:798-805, 2001.
- _____ O45 Kudaibergenov, S.E., et al., "Temperature-Responsive Swelling and Deswelling of the Copolymers from Vinyl Ether of Ethylene Glycol and Butyl Vinyl Ether," *Macromol. Rapid Commun.* 16(11):855-860, November 1995.
- _____ O46 Kunugi, S., et al., "Microcalorimetric Study of Aqueous Solution of a Thermoresponsive Polymer, Poly(*N*-Vinylisobutyramide) (PNVIBA)," *Polymer Journal* 34(5):383-388, May 2002.
- _____ O47 Kushida, A., et al., "Two-Dimensional Manipulation of Differentiated Madin-Darby Canine Kidney (MDCK) Cell Sheets: The Noninvasive Harvest from Temperature-Responsive Culture Dishes and Transfer to Other Surfaces," *J. Biomed. Mater. Res.* 54(1):37-46, 2001.
- _____ O48 Lee, B.H., et al., "A Thermosensitive Poly(Organophosphazene) Gel," *Macromolecules* 35(10):3876-3879, 2002.
- _____ O49 Lee, R.J., and L. Huang, "Lipidic Vector Systems for Gene Transfer," *Critical Reviews in Therapeutic Drug Carrier Systems* 14(2):173-206, 1997.
- _____ O50 Lee, W.-F., and G.-C. Hung, "Thermoreversible Hydrogels .I. Synthesis and Effect of a Hydrophobic Monomer on Swelling Behaviors of Thermoreversible Gels Prepared by Copolymerizing *N*-Alkoxyalkylacrylamide with Butyl Acrylate," *J. Appl. Polym. Sci.* 64(8):1477-1484, May 23, 1997.
- _____ O51 Lin, S.-Y., et al., "Thermal Micro ATR/FT-IR Spectroscopic System for Quantitative Study of the Molecular Structure of Poly(*N*-Isopropylacrylamide) in Water," *Polymer* 40:2619-2624, 1999.
- _____ O52 Loos, W., et al., "Thermo-Responsive Organic/Inorganic Hybrid Hydrogels Based on Poly(*N*-Vinylcaprolactam)," *Macromol. Chem. Phys.* 204(1):98-103, 2003.
- _____ O53 Lydon, M.J., et al., "Cellular Interactions With Synthetic Polymer Surfaces in Culture," *Biomaterials* 6(6):396-402, November 1985.
- _____ O54 MacBeath, G., and S.L. Schreiber, "Printing Proteins as Microarrays for High-Throughput Function Determination," *Science* 289(5485):1760-1763, September 8, 2000.

*Examiner Initial	Cite No.
_____	O55 Maeda, Y., et al., "Hydration and Phase Behavior of Poly(<i>N</i> -Vinylcaprolactam) and Poly(<i>N</i> -Vinylpyrrolidone) in Water," <i>Macromolecules</i> 35(1):217-222, 2002.
_____	O56 Marczak, W., and A. Banaś, "The Hydrophobic and Hydrophilic Interactions in the System 2,4,6-Trimethylpyridine-Water in the Vicinity of and Above the Lower Critical Solution Temperature," <i>Fluid Phase Equilibria</i> 186(1-2):151-164, 2001.
_____	O57 Merrett, K., et al., "Adhesion of Corneal Epithelial Cells to Cell Adhesion Peptide Modified pHEMA Surfaces," <i>J. Biomater. Sci. Polymer Edn.</i> 12(6):647-671, 2001.
_____	O58 Moselhy, J., et al., " <i>In Vitro</i> Studies of the Interaction of Poly(NIPAm/MAA) Nanoparticles With Proteins and Cells," <i>J. Biomater. Sci. Polymer Edn.</i> 11(2):123-147, 2000.
_____	O59 Nakajima, K., et al., "Intact Microglia are Cultured and Non-Invasively Harvested Without Pathological Activation Using a Novel Cultured Cell Recovery Method," <i>Biomaterials</i> 22(11):1213-1223, 2001.
_____	O60 Nakayama, Y., and T. Matsuda, "Surface Macromolecular Microarchitecture Design: Biocompatible Surfaces via Photo-Block-Graft-Copolymerization Using <i>N,N</i> -Diethyldithiocarbamate," <i>Langmuir</i> 15(17):5560-5566, 1999.
_____	O61 Nath, N., and A. Chilkoti, "Fabrication of a Reversible Protein Array Directly From Cell Lysate Using a Stimuli-Responsive Polypeptide," <i>Anal. Chem.</i> 75(4):709-715, February 15, 2003.
_____	O62 Ng, J.H., and L.L. Ilag, "Biomedical Applications of Protein Chips," <i>J. Cell. Mol. Med.</i> 6(3):329-340, 2002.
_____	O63 Okamura, H., et al., "A Novel Thermosensitive Polymer, Poly(Methyl 2-Propionamidoacrylate), With Geminal Substituents," <i>Polymer</i> 43(13):3825-3828, 2002.
_____	O64 Okano, T., et al., "Temperature-Responsive Poly(<i>N</i> -Isopropylacrylamide) as a Modulator for Alteration of Hydrophilic Hydrophobic Surface Properties to Control Activation/Inactivation of Platelets," <i>J. Control. Release</i> 36:125-133, 1995.
_____	O65 Pan, Y.V., et al., "Plasma Polymerized <i>N</i> -Isopropylacrylamide: Synthesis and Characterization of a Smart Thermally Responsive Coating," <i>Biomacromolecules</i> 2(1):32-36, 2001.

*Examiner Initial	Cite No.
_____	O66 Park, S.Y., et al., "Characterization of Temperature-Induced Phase Transition of Polymer Complex Composed of Poly-(<i>N,N</i> -Dimethylamino)ethyl Methacrylate and Poly(Ethylacrylamide) by ¹ H-1-NMR Relaxation Time Measurement," <i>European Polymer Journal</i> 37(9):1785-1790, 2001.
_____	O67 Park, Y.S., and Y. Ito, "Micropattern-Immobilization of Heparin to Regulate Cell Growth With Fibroblast Growth Factor," <i>Cytotechnology</i> 33:117-122, 2000.
_____	O68 Persson, J., et al., "Polymer Recycling in Aqueous Two-Phase Extractions Using Thermoseparating Ethylene Oxide-Propylene Oxide Copolymers," <i>Journal of Chromatography B</i> 743(1-2):115-126, 2000.
_____	O69 Pettit, D.K., et al., "Influence of the Substrate Binding Characteristics of Fibronectin on Corneal Epithelial Cell Outgrowth," <i>J. Biomed. Mater. Res.</i> 26(10):1259-1275, October 1992.
_____	O70 Priest, J.H., et al., <i>Lower Critical Solution Temperatures of Aqueous Copolymers of N-Isopropylacrylamide and Other N-Substituted Acrylamides</i> , ACS Symposium Series 350, New York, New York, April 13-18, 1986, pp. 255-264.
_____	O71 Sanford, M.S., et al., "Photoactivatable Cross-Linked Polyacrylamide for the Site-Selective Immobilization of Antigens and Antibodies," <i>Chem. Mater.</i> 10(6):1510-1520, 1998
_____	O72 Schakenraad, J.M., et al., "The Influence of Substratum Surface Free Energy on Growth and Spreading of Human Fibroblasts in the Presence and Absence of Serum-Proteins," <i>J. Biomed. Mater. Res.</i> 20(6):773-784, July/August 1986.
_____	O73 Shimizu, T., et al., "Two-Dimensional Manipulation of Cardiac Myocyte Sheets Utilizing Temperature-Responsive Culture Dishes Augments the Pulsatile Amplitude," <i>Tissue Engineering</i> 7(2):141-151, 2001.
_____	O74 Sigal, G.B., et al., "Effect of Surface Wettability on the Adsorption of Proteins and Detergents," <i>J. Am. Chem. Soc.</i> 120(14):3464-3473, 1998.
_____	O75 Sugiyama, K., et al., "Preparation and Application of Chiral Recognizable Thermosensitive Polymers and Hydrogels Consisting of <i>N</i> -Methacryloyl-s-Phenylalanine Methyl Ester," <i>J. Appl. Polym. Sci.</i> 82(1):228-236, 2001.
_____	O76 Takada, M., et al., "Interaction Parameters of Poly(Vinyl Methyl-Ether) in 2-Propanol Water Mixture as Determined by Small-Angle Neutron- Scattering," <i>Kobunshi Ronbunshu</i> 51(11):689-693, 1994. [Abstract]

*Examiner Initial	Cite No.
_____	O77 Takahashi, M., et al., "Thermoreversible Gelation and Phase Separation in Aqueous Methyl Cellulose Solutions," <i>J. Polym. Sci. Part B: Polym. Phys.</i> 39(1):91-100, 2001.
_____	O78 Terada, T., et al., "Raman Spectroscopic Study on Water in Aqueous Solutions of Temperature-Responsive Polymers: Poly(<i>N</i> -Isopropylacrylamide) and Poly[<i>N</i> -(3-Ethoxypropyl)Acrylamide]," <i>Macromol. Chem. Phys.</i> 195(9):3261-3270, September 1994.
_____	O79 Welin-Klintström, S., et al., "Surfactant and Protein Interactions on Wettability Gradient Surfaces," <i>J. Colloid Interface Sci.</i> 158:188-194, 1993.
_____	O80 Williams, D.F. (ed.), <i>Techniques of Biocompatibility Testing, Volume II</i> , CRC Press, Boca Raton, Florida, 1986, Chap. 9, "Techniques for Protein Adsorption Studies," pp. 184-212.
_____	O81 Wright, E.R., and V.P. Conticello, "Self-Assembly of Block Copolymers Derived From Elastin-Mimetic Polypeptide Sequences," <i>Advanced Drug Delivery Reviews</i> 54(8):1057-1073, 2002.
_____	O82 Wu, R.Z., et al., "Cell-Biological Applications of Transfected-Cell Microarrays," <i>Trends Cell Biol.</i> 12(10):485-488, October 2002.
_____	O83 Xiong, X., et al., "Controlled Multibatch Self-Assembly of Microdevices," <i>J. Microelectromech. Sys.</i> 12(2):117-127, April 2003.
_____	O84 Yamada, N., et al., <i>Makromolekulare Chemie, Rapid Communications</i> 11(11):571-576, November 1990.
_____	O85 Yamato, M., et al., "Novel Patterned Cell Coculture Utilizing Thermally Responsive Grafted Polymer Surfaces," <i>J. Biomed. Mater. Res.</i> 55(1):137-140, April 2001.
_____	O86 Yamato, M., et al., "Release of Adsorbed Fibronectin From Temperature-Responsive Culture Surfaces Requires Cellular Activity," <i>Biomaterials</i> 21:981-986, 2000.
_____	O87 Yamato, M., et al., "Thermo-Responsive Culture Dishes Allow the Intact Harvest of Multilayered Keratinocyte Sheets Without Dispose by Reducing Temperature," <i>Tissue Engineering</i> 7(4):473-480, 2001.
_____	O88 Yousaf, M.N., et al., "Using Electroactive Substrates to Pattern the Attachment of Two Different Cell Populations," <i>Proc. Natl. Acad. Sci. US A</i> 98(11):5992-5996, May 22, 2001.

*Examiner Cite
Initial No.

O89 Zhong, Y.Z., and P. Wolf, "Effects of Hydrophobic Unit and Its Distribution on Solution Properties of Vinyl Pyrrolidone and Vinyl Acetate Copolymer," *J. Appl. Polym. Sci.* 74(2):345-352, 1999.

Examiner

Date Considered

*Examiner: Initial if reference considered, whether or not citation is in conformance with M.P.E.P. § 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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